

## Notes on 2011-2012 sightings of Black-necked Cranes (*Grus nigricollis*) and other birds on the Dam Chu Wetland, Zaduo County, Qinghai, China

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**Abstract:** The vast Dam Chu Wetland (N32°54', E94°08') lies at an elevation of 4,700 m in Qinghai's Zaduo County. The wetland has a maximum length and width of roughly 150 km and 60 km, respectively, and is comprised of thousands of permafrost-controlled ponds and pools set amidst *Kobresia* and *Carex* meadow ecosystems. The wetland is crossed by the upper Dam Chu River, the largest source of the Yangtze by volume. Due to its remote location, the Dam Chu Wetland is little studied, with an extensive literature review turning up no published crane records for the site. Three 2–3 day visits were made to the Dam Chu Wetland in July 2011, April 2012, and July 2012, during which three partial surveys of the eastern wetland were made resulting in Black-necked Crane counts of 4, 45, and 14 individuals, respectively. Notably, in July 2012 three crane pairs were observed, each with a pair of recently hatched chicks. Although cranes on the Dam Chu Wetland are widely scattered, the wetland appears to be an important Black-necked Crane site and breeding ground. The wetland is frozen from about early November to early May each year. However, with regional warming, the annual frozen period is expected to shorten, possibly resulting in more favorable conditions for cranes and increased crane numbers. Five mammal and 21 other bird species were also sighted in the wetland. The Dam Chu Wetland currently qualifies for Ramsar designation under Criterion 2 based on its Black-necked Crane population.

**Keywords:** Black-necked Crane (*Grus nigricollis*); Dam Chu Wetland; Dam Chu River; Sanjiangyuan National Nature Reserve; Yangtze source region; Zaduo County; Qinghai

## 2011—2012 年青海省杂多县当曲湿地黑颈鹤及其他鸟类观察

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**摘要:** 广阔的当曲湿地 (N32°54', E94°08') 位于青海省杂多县境内, 海拔 4 700 m。该湿地为一狭长区域, 最大长度 150 km、最大宽度 60 km, 由散布在蒿草和苔草草甸中的数千个池塘组成, 池塘下为永久冻土层。湿地与当曲河上游交叉, 该河流为黄河提供了最大的水源供给。由于地域偏僻, 当曲湿地鲜有研究, 虽然有关黑颈鹤 (*Grus nigricollis*) 的文献不断涌出, 但并无关于该地黑颈鹤的记录。作者于 2011 年 7 月、2012 年 4 月和 2012 年 7 月, 对当曲湿地东部的局部进行了调查, 3 次分别记录到黑颈鹤 4 只、45 只和 14 只。值得注意的是, 2012 年 7 月的调查中观察到 3 对繁殖黑颈鹤, 并且分别带有出壳不久的 2 只幼鹤。尽管黑颈鹤在当曲湿地分布非常分散, 该湿地仍是一个重要的黑颈鹤分布点和繁殖区。每年 11 月初至次年的 5 月初, 当曲湿地都处于冰冻状态。随着区域温度的上升, 每年的冰冻期将缩短, 将可能导致黑颈鹤喜好的生境的扩增和黑颈鹤种群数量的增长。在该湿地还记录到 5 种哺乳动物和其他 21 种鸟类。基于当曲湿地黑颈鹤的种群数量, 该湿地已具备认定为国际重要湿地的第二条标准。

**关键词:** 黑颈鹤; 当曲湿地; 当曲河; 三江源国家级自然保护区; 长江发源地; 杂多县; 青海

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The Black-Necked Crane (*Grus nigricollis*) is the world's only high-altitude crane species, breeding exclusively in the high-altitude wetlands of the northern, central, and western Tibetan Plateau while spending winters amongst wetlands and agricultural fields in China's southern Tibet Autonomous Region (TAR), northwest Yunnan Province, and western Guizhou Province as well as in Bhutan (BirdLife International, 2001; Bishop, 1996). The most recent comprehensive total population estimate for this species was made in 2007 as 11,000 individuals (Bishop & Drolma, 2007). The species is classified as vulnerable by the International Union for Conservation of Nature (IUCN) due to its single small population, the wide-spread loss of wetlands throughout its range, and changing agricultural practices on its wintering grounds that have reduced the supply of waste grain that these cranes feed on (BirdLife International, 2014). These changes include immediate autumn plowing of fields and conversion of barley fields to greenhouse agriculture (Bishop et al., 2000).

While observed in groups as large as 330 in winter, in summer Black-necked Cranes are widely dispersed on their northern breeding grounds (Bishop, 1996; Bishop & Drolma, 2007). However, relatively high concentrations of breeding Black-necked Cranes do occur in spring and summer at the species' three most important known breeding sites: (1) the Ruoergai Marshes of northern Sichuan, with an estimated Black-necked Crane population of 2,600; (2) the TAR's Seling Lake Black-necked Crane National Nature Reserve (no accurate population estimate available); and (3) the Longbao National Nature Reserve in Qinghai, with an estimated population of about 114 (BirdLife International, 2001; Bishop, 1996; Li, 2010; Farrington & Zhang, 2013).

While Black-necked Cranes at the above three breeding sites have been periodically studied since the late 1970s, to date little is known about their presence in the vast Dam Chu Wetland in Qinghai's Yangtze Source Region. In the course of preliminary research on climate change impacts on high altitude wetlands in the greater Yangtze Source Region in 2011 and 2012, initial observations on Black-necked Cranes and other birdlife at the Dam Chu Wetland were made as discussed in detail below.

## STUDY AREA AND METHODS

### Study area

The Dam Chu Wetland (N32°54', E94°08') is located

at the foot of the fabled Tanggula Range in southern Qinghai Province's Zaduo County. The main wetland zone in the Dam Chu Basin is roughly 150 km in length and 60 km in width at its widest. This wetland forms the headwaters of the Dam Chu River, the southern source of the Yangtze. With a total annual flow volume of 4,600 million m<sup>3</sup>, the Dam Chu is by far the largest of the three major sources of the Yangtze, the other two being the Chumar River (annual flow volume: 1,039 million m<sup>3</sup>), the northern source, and the Tuotuo River (annual flow volume: 918 million m<sup>3</sup>), the official source (Shen, 2009). There are three major lakes in the western half of the wetland, Niriacuogai, Zhangmucuo, and Gaeencuonama Lakes. Lying at an average elevation of about 4,700 m, the Dam Chu Wetlands are one of the highest of the world's major wetland areas.

Vegetation in the wetlands is predominantly short-growing *Kobresia/Carex* sedge grass meadows supported by a thin organic turf layer overlying sandy subsoil. Dominant species in the basin were *Kobresia tibetica*, *K. humilis*, *Carex moorcroftii*, *C. atrofusca*, and *K. pygmaea*, with companion species such as *Astragalus confertus*, *Saussurea japonica*, *Potentilla saundersiana*, *P. fruticosa*, and *Leontopodium nanum* (Zhang JP et al., 2011).

Due to the basin's extreme elevation, the entire wetland is underlain by a continuous permafrost layer that has led to the formation of thousands of surface ponds and pools (Zhao & Li, 2009). However, even a cursory look at online satellite imagery of the upper Dam Chu basin reveals many of these shallow surface pools to be partially or completely dried up, which may be a result of permafrost degradation caused by climate change (e.g. see Wang et al., 2006; Zhao & Li, 2009). Climatic warming in the Dam Chu River basin is also evidenced by rapid glacier melt-off rates of 8.25-9 m/year that were reported as early as the mid-1990s (Sun & Tang, 1995 cited in Dong et al., 2002). Retreat of glaciers elsewhere in the Yangtze Source Region is also corroborated by Shen, although at much slower rates than reported by Sun and Tang (Shen, 2009).

Temperatures in the upper Dam Chu basin are extremely cold. At the time of the author's second visit to the Dam Chu Wetland from April 25-27, 2012, apart

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from the major rivers, nearly the entire wetland was completely frozen over as it presumably is from early November to early May each year. At the nearest meteorological station in the Zaduo County seat, located in a sheltered valley some 100 km to the east of the Dam Chu Wetland and over 600 m lower in elevation at 4,068 m, average high and low temperatures from 1958–2007 were approximately  $-2^{\circ}\text{C}$  and  $-18^{\circ}\text{C}$  in January and  $18^{\circ}\text{C}$  and  $6^{\circ}\text{C}$  in July, the coldest and warmest months of the year respectively (Chen et al., 2006; National Meteorological Center, 2014). Average annual precipitation at the Zaduo meteorological station over the same 50-year period was about 520 mm, with a peak average monthly precipitation of about 118 mm occurring in June at the onset of the summer rainy season (National Meteorological Center, 2014).

Zhang JP et al. (2011) used a remote sensing-based classification system to divide wetlands of the entire 16,700 km<sup>2</sup> Dam Chu River basin into eight wetland types, namely *Carex-Kobresia* swamp, *Kobresia* swampy meadow, *K. pygmaea* wet meadow, flooded wetlands, lake, river, lacustrine pond, and glacial lake-type wetlands. The entire Dam Chu Wetland is drained by the Dam Chu River and its numerous tributaries, with these rivers having sandy braided channels lined with high sand banks.

In terms of population, the eastern half of the Dam Chu Wetland, where cranes were sighted, is sparsely populated by semi-nomadic yak herders who camp

throughout the wetland during the summer. An official county government website dated August 11, 2009 placed the population and area of Chadon Township, the only significant population center on the eastern wetland, at 1,000 people and 9,000 km<sup>2</sup>, respectively, a population density of about 1 person per 9 km<sup>2</sup> (Zaduo County, 2009). Interviewed families typically held 30–40 yaks in the summer of 2011 and stated that since about 2006 they have fenced off their private pasture holdings on the Dam Chu Wetland, which is now extensively criss-crossed with fencing.

In spite of the extensive fencing on the wetland, wildlife sighted there in 2011 and 2012 included small numbers of Tibetan wild ass (*Equus kiang*) and Tibetan gazelle (*Procapra picticaudata*) as well as wolves (*Canis lupus*), Tibetan sand fox (*Vulpes ferrilata*), and black-lipped pika (*Ochotona curzoniae*).

### Study methods

Study methods used were rather simple, and only involved driving along the established dirt roads and jeep tracks around the eastern half of the Dam Chu Wetland, stopping at vantage points with good views over the wetland to look for cranes, birds, and other wildlife using a spotting scope and binoculars. The first visit was made on July 22–23, 2011 and involved driving along the main county road connecting the Zaduo County Seat and Chadon Township and then driving west from Chadon Township approximately 25 km along an improved track

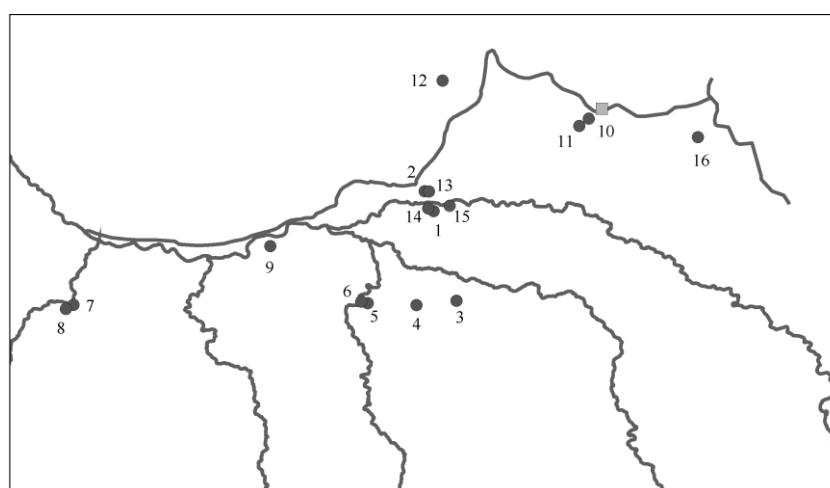


Figure 1 Map of Black-necked Crane sightings on the Dam Chu Wetland in the upper Dam Chu River basin, Zaduo County, Qinghai, 2011–2012

Square: Chadon Township center. Dots: Black-necked Crane sighting points numbered in chronological order (See Table 1 for corresponding crane counts at each sighting point). Lines: The Dam Chu River and its upper tributaries in the Dam Chu Wetland, except the top smooth line being the main Zaduo-Chadon county road.

that eventually passes along the north bank of the Dam Chu River (Figure 1). This visit included one short (1.7 km) side trip to the north bank of the Dam Chu River made approximately 19 km along the track west of Chadon, where the track bends northward away from the river. Total one-way driving distance along the northern edge of the wetland was about 55 km. The second visit on April 25–27, 2012 involved driving to Chadon Township along the Zaduo road, then turning directly south at Chadon on a jeep track to begin a circular ground survey route of the wetland that crossed the upper Dam Chu River and proceeded in a westward direction south of the Dam Chu, crossing four major tributaries. After crossing the fourth tributary, the track turned north to rejoin the county road along the north bank of the Dam Chu, with the route being completed at Chadon for a total one-way driving distance of about 120 km along the wetland. The third visit on July 14–15, 2012 replicated the route of the first visit in July 2011.

## RESULTS

Observations on Black-necked Cranes compiled during the course of the three site visits are summarized in Table 1, while a list of all bird species observed is provided in Table 2. During the July 2011 visit, only two pairs of cranes were sighted, within about a km of each other on opposite sides of the Dam Chu River, although observations were hampered by rain squalls and a lack of knowledge of local jeep tracks. On the second visit to the wetland in April 2012, although apart from the major rivers, the wetland was still frozen over; 45 Black-necked Cranes in total were observed at nine widely dispersed locations, including 31 cranes sighted in one group. In July 2012, a short visit resulted in the sighting of eight adult cranes at five locations in three widely separated areas of the wetland, of which three pairs each had a pair of chicks that presumably hatched in the Dam Chu Wetland in June of that year. In total, 22 species of birds were sighted on the Dam Chu Wetland, all in relatively small numbers. Easily the most abundant species sighted was the Ruddy Shelduck (*Tadorna ferruginea*), with just 67 counted over ~12 hours of observation during the wetland ground survey of April 25–27, 2012. Thirty of these were sighted in a single small unfrozen pond south of the Dam Chu River on April 26th. Twenty-five Bar-headed Geese (*Anser indicus*) were also sighted during the April visit, with 22

**Table 1 Black-necked Crane sightings in the eastern Dam Chu Wetland, 2011–2012**

Sighting Number	Date	Adult BNC (n)	Juvenile BNC (n)
Site Visit 1			
1*	July 23, 2011	2	0
2	July 23, 2011	2	0
Total		4	0
Site Visit 2			
3	April 25, 2012	2	0
4	April 25, 2012	31	0
5	April 25, 2012	2	0
6	April 25, 2012	1	0
7	April 26, 2012	2	0
8	April 26, 2012	2	0
9	April 26, 2012	2	0
10	April 27, 2012	2	0
11	April 27, 2012	1	0
Total		45	0
Site Visit 3			
12	July 14, 2012	2	2
13	July 14, 2012	2	2
14	July 14, 2012	2	2
15	July 14, 2012	1	0
16	July 15, 2012	1	0
Total		8	6

\*Sighting numbers correspond to sighting point locations shown in Figure 1.  
BNC: Black-necked Crane.

of these geese sighted on the same small pond with the 30 Shelducks mentioned above. Other relatively common species sighted in far smaller numbers were the Common Redshank, Hume's Groundpecker, Common Raven, Horned Lark, and the White-rumped and Rufous-necked snowfinches. Twelve Common Mergansers were seen on the main channel of the Dam Chu River during the July 2011 visit, while the remaining 12 species were sighted in numbers of ten or less.

## DISCUSSION

The seasonal presence of Black-necked Cranes in Zaduo County was a well-established fact prior to this survey (e.g. see BirdLife International, 2001; Li & Li, 2005).

**Table 2 Birds sighted in the eastern Dam Chu Wetland, 2011–2012**

No.	Common name	Scientific name	Abundance
1	Bar-headed Goose	<i>Anser indicus</i>	F
2	Ruddy Shelduck	<i>Tadorna ferruginea</i>	C
3	Mallard	<i>Anas platyrhynchos</i>	U
4	Common Merganser	<i>Mergus merganser</i>	F
5	Little Owl	<i>Athene noctua</i>	F
6	Black-necked Crane	<i>Grus nigricollis</i>	F
7	Common Redshank	<i>Tringa totanus</i>	C
8	Greater Sand Plover	<i>Charadrius morinellus</i>	U
9	Pallas's Gull	<i>Larus ichthyaeus</i>	F
10	Brown-headed Gull	<i>Larus brunnicephalus</i>	F
11	Common Tern	<i>Sterna hirundo</i>	F
12	Hen Harrier	<i>Circus cyaneus</i>	U
13	Steppe Eagle	<i>Aquila nipalensis</i>	U
14	Saker Falcon	<i>Falco cherrug</i>	F
15	Hume's Groundpecker	<i>Pseudopodoces humilis</i>	C
16	Common Raven	<i>Corvus corax</i>	C
17	Black Redstart	<i>Phoenicurus ochruros</i>	F
18	Sand Martin	<i>Riparia riparia</i>	F
19	Tibetan Lark	<i>Melanocorypha maxima</i>	F
20	Horned Lark	<i>Alauda gulgula</i>	C
21	White-rumped Snowfinch	<i>Pyrgilauda taczanowskii</i>	C
22	Rufous-necked Snowfinch	<i>Pyrgilauda ruficollis</i>	C

Abundance categories: A=Abundant: regular in very large numbers; C=Common: regular in large numbers; F=Fairly common: regular in moderate numbers; U=Uncommon: somewhat regular in small numbers; R=Rare: occasional in very small numbers.

However, an extensive search of both the English and Chinese literature, including the comprehensive list of historical Black-necked Crane sightings in *Threatened Birds of Asia*, Vaurie's comprehensive volume on Tibetan Plateau birds, and Li and Li's comprehensive work on Black-necked Crane research produced no published reports of crane or bird sightings on the Dam Chu Wetland, although unpublished records may exist (BirdLife International, 2001; Li & Li, 2005; Vaurie, 1972). The fact that the Dam Chu Wetland has been little studied is presumably due to its extremely remote location, its extreme elevation and weather, and its poor roads, which were only recently improved. Scientific expeditions of the 19<sup>th</sup> and 20<sup>th</sup> Centuries no doubt wished to steer wide of the vast morass of the Dam Chu River source, sticking to the well-traveled Lhasa-Golmud caravan route to the west, now the Qinghai-Tibet Highway.

In fact, locating Black-necked Cranes in the broad expanse of the Dam Chu Wetland proved to be a time-consuming and labor-intensive effort. However, a significant number of Black-necked Cranes were seen to be widely dispersed across the wetland, and the wetland is clearly a breeding ground for some of these cranes. Given the Black-necked Crane's current "Vulnerable" IUCN classification, the Dam Chu Wetland appears to qualify for Ramsar Wetland of International Importance designation under Ramsar Criterion 2, which states that a wetland is considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities (BirdLife International, 2014; Ramsar, 2009).

The paucity of birdlife amidst the enormous wetland came as something of a surprise, but is presumably attributable to the extreme altitude, harsh climate, and low productivity of the ponds and lakes in the wetland, which appeared to support extremely little in the way of emergent vegetation, invertebrates, amphibians and fish. Consequently, migratory waterfowl congregate at more favorable wetlands elsewhere in the region in spring and summer, such as at Qinghai Lake and Yushu County's Longbao Wetland. Nevertheless, two separate satellite telemetry studies have shown that from about mid-October to early November, the Dam Chu Wetland is an important autumn migration stopover site for Bar-headed Geese migrating south from Qinghai Lake (Liu, 2011; Zhang YN et al., 2011).

Thus, although Black-necked Cranes are widely dispersed on the vast expanse of the Dam Chu Wetland during spring and summer, from the three partial survey routes of the wetland conducted, the wetland as a whole appears to be an important crane site that supports a significant number of breeding pairs. A properly timed visit would no doubt also reveal a significant number of other waterbirds stopping over on both the spring and autumn migrations, which at the Longbao Wetland 225 km to the east corresponds to late April to early June and late September to early November, respectively (Farrington et al., 2013). However, it is entirely possible that with the rapid climatic warming that is occurring throughout the Tibetan Plateau, the annual thaw period at the Dam Chu wetland will lengthen, and with it the site's importance for Black-necked Cranes and other migratory waterbirds (e.g. see Farrington, 2009).

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